GEND 113: Fall 2023

The Scientific Mind: Physical Sciences

Course Prefix, Name & Section	**Gend 113 – *The Scientific Mind: Physical Sciences***
Professor	*Rachel Fogle, PhD*
Location/Times/Modality	*M/W/F 11:10am-12:10pm (Rm 1246)* *M/W/F 1:20pm-2:20pm (Rm 1246)*
Office & Office Hours	Rm 1127 – Office hours by appointment MS Teams – Office hours by appointment
Contact Phone Number (s)	717-901-5100 x1632
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Course Description

This course is part of the Scientific Mind series, designed to provide students with a broad, interdisciplinary overview of modern science. Through a strong emphasis on the scientific method, the course develops students' critical thinking, problem-solving, mathematical reasoning, experimental design, and information literacy—skills essential for success in the sciences and beyond. GEND 113 focuses specifically on foundational concepts in biology. Students explore the properties of living organisms, the differences between prokaryotic and eukaryotic cells, patterns of inheritance, and the central dogma of molecular biology. Additional topics include mitosis and meiosis, cellular structures, photosynthesis, metabolism, genetics. Broader ecological themes such as biodiversity, classification, evolution, ecosystems, and the biosphere are also discussed, emphasizing the interconnectedness of life on Earth.

Prerequisites

None

Course Learning Outcomes (CLO)

The student who successfully completes this course will be able to: ***(core competencies in bold)***

- *Describe the fundamental concepts of biology* ***(Critical Thinking)***
  - *Describe biological macromolecules and their respective roles in the cell*
  - *Compare cell structure and function between prokaryotic and eukaryotic cells*
  - *Explain metabolic processes, the cell cycle, and how cancer results*
  - *Describe fundamentals of Mendelian genetics leading to unity & diversity of life*
  - *Explain mechanisms of population growth and regulation*

*Apply the scientific method to experimentation **(Critical Thinking and Communication)***
    - *Develop hypotheses and design experiments using GEND 113's interdisciplinary examples, drawing from physical sciences, chemistry, and biology.*
    - *Create a form of scientific communication that appeals to scientists and non-scientists*
- *Critically analyze scientific literature and data **(Critical Thinking)***
    - *Apply appropriate methodologies (such as graphing or statistics) to analyze data*
    - *Interpret data (in the literature or your own experimental results)*
    - *Use and understand scientific notation, metric measurements, precision, etc. appropriately*

Textbook and Course Materials

- ***Recommended Resource(s)** – all open-access educational resources*
  Biology I | Lumen Learning - https://www.oercommons.org/courses/biology-i/view
  Learn Biology | Visible Body - https://www.visiblebody.com/learn/biology
  JoVE Core | Biology - https://www.jove.com/science-education/jovecore
  College Biology | Khan Academy - https://www.khanacademy.org/science/ap-biology

- ***Recommended Readings***
  Select articles and other useful academic materials will be provided within the LMS (Canvas).

Course Structure

*The lecture portion of **GEND 113: The Scientific Mind - Biology** integrates a flipped classroom approach, where video lectures, readings, and other learning materials are expected to be reviewed prior to synchronous class meetings. During live sessions, students engage with core biological topics—such as genetics, microbiomes, metabolism, and cell structures—through team-based discussions, hands-on activities, application exercises, and critical thinking tasks. This approach supports deeper understanding of biological principles while promoting collaborative and active learning in line with the course's interdisciplinary scientific focus.*

Course Policies

- ***Attendance.** Attendance and participation are crucial for a complete understanding of course material. It is the expectation that students attend class in person unless they have made alternative arrangements with me prior to the start of class due to illness, medical reasons, or the need to isolate or quarantine.*
- ***Assignments.** There will be both "synchronous" (live) and "asynchronous" (on your own time) components of the course. All course materials and assignment deadlines will be available through the LMS (Canvas).*
- ***Digital Citizenship.** Students are required to know and adhere to all HU technology requirements. While many devices can be used to access course materials, you may be required to use a laptop computer to fully participate in some classes. Please limit your use of technology concepts related to course discussions and in-class activities, as these technologies can be distracting – not only for you, but to others in the class.*
- ***Academic Honesty.** Academic dishonesty, to include cheating, plagiarism, and fabrication, undermines the learning experience. It is deceptive and consequently corrosive to HU's intellectual principles and*

ethical standards. Students must adhere to the Academic Code which sets forth standards of integrity and honesty. The Academic Code is located in the Student Handbook, *located on MyHU.*

Course Outline Schedule

(The following schedule reflects guidelines for the course. Refer to the LMS for updated due dates and assignment information.)

Week	Week of…	Topic (Related Module)	Assignments
1	Jan 9	Introduction & Syllabus Review Process of Science (1)	Science of Biology Quiz Science of Biology Concept Map
2	Jan 16	Chemical Foundation of Life (2)	Nature of Molecules & Properties of Water Quiz
3	Jan 23	Biological Macromolecules (3) Review	Biological Molecules Concept Map (KA) Lecture-Based Quizzes (1-3)
4	Jan 30	Cell Structure & Function (4)	**Exam I**
5	Feb 6	Cell Diversity (5) Structure & Function of Membranes (6)	Membranes Crossword Puzzle
6	Feb 13	Review Energy & Metabolism (supplemental)	Lecture-Based Quizzes (4-6) **Exam II**
7	Feb 20	Cellular Respiration (8)	
8	Feb 27	No Class – Spring Recess	
9	March 6	Photosynthesis (7) Review Cell Communication (supplemental)	Lecture-Based Quizzes (7-8) **Exam III**
10	March 13	Cell Division and Cell Cycle (11)	Cell Cycle & Mitosis Crossword Puzzle
11	March 20	Review Patterns of Inheritance (Intro)	Lecture-Based Quizzes (Cell Communication & 11) **Exam IV**
12	March 27	Genes and Proteins (9)	
13	April 3	Genes and Chromosomes (10)	
14	April 10	Genetics and Inheritance (12)	Genetic Counseling Activity (KA)
15	April 17	Evolution and Its Processes (13) Review	Lecture-Based Quizzes (9-10 and 12-13)
Finals	TBD		**Final Exam**

*All content within this syllabus, including the proposed class schedule, is subject to change due to extenuating circumstances. If changes are considered as necessary, you will be notified of any modifications and an updated copy of the syllabus will be posted on the LMS. *

GRADING & GRADING POLICIES

Your final percentage for the course will be based on a combination of factors totaling 100%. Remember, you will receive a separate letter grade for the companion lab. Below is the breakdown for the overall course grade:

Assignment	Description of Assignment	Points/Weight
Class Attendance & Active Participation	*Completed during our synchronous class session – including team-based activities, application exercises, concept mapping, and other interactive/active learning environments* *If you are not in attendance, you will not be able to earn credit for active participation!*	15%
Graded Activities	*Completed asynchronously – including lecture-based quizzes, concept mapping, and assigned worksheets* *A 10% grade deduction per day for late submissions will be applied.*	30%
Exam I / Exam II / Exam III / Exam IV	*These exams will cover material from the respective sections of the course (see course schedule). These exams are intended to help the student develop higher-order thinking skills by correlating things covered in lecture and the assigned book chapters to approach scientific problems.* *The format of the exams will be a combination of multiple choice, matching, fill-in-the-blank, and short essay as a means to demonstrate learned principles.*	40% (10% each)

Final Exam	*The final exam will primarily focus on material obtained in the final block of the semester, but as the concepts in biology build upon one another it is essential that the student has a strong foundation in materials covered earlier in the semester.* *The format of the final exam will be a combination of multiple choice, matching, fill-in-the-blank, and short essay as a means to demonstrate learned principles.*	15%

Grade	Percentage (%)	Description for Attainment of Intended CLO
A A- (Excellent)	93-100 90-92.9	Exemplary range and depth of attainment of intended learning outcomes, demonstrates a command of relevant materials and analyses, and critical thinking relating to key issues, concepts and procedures
B+ B B- (Good)	87-89.9 83-86.9 80-82.9	Clear attainment of most of the intended learning outcomes, some securely grasped more so than others, displaying a variable depth of understanding
C+ C C- (Satisfactory)	77-79.9 73-76.9 70-72.9	Acceptable attainment of intended learning outcomes, displaying a qualified familiarity with relevant materials, and a grasp of the analytical issues and concepts which is generally reasonable
D (Weak)	60-69.9	Attainment deficient with respect to specific learning outcomes, depth of knowledge and weak arguments demonstrates deficiencies
F (Poor)	<59.9	No convincing evidence of attainment of intended learning outcomes, knowledge and use of relevant materials is directionless and fragmentary

HU Help and Resources

HU is committed to providing an environment of diversity, mutual respect and support. Refer to the *Help and Resources Tab* on the HU LMS (Canvas) global navigation menu for information on all HU Resources including (but not limited to) the following:

- **HU Student Services** *(Tutoring and Learning Strategies, Disability Services, Counseling Services, Student Activities, Housing and Residential Life, Conduct and Policy)*
- **Student Support Portals** *(International Student Office, HU Business Office, Records and Registration, IT Help Desk and Graduate Student Services)*
- **HU Library**
- **Canvas Support**

HU Policies

Students are responsible for complying with all policies and regulations listed in the current *HU Student Handbook located on MyHU* Portal including, but not limited to, the HU Code of Conduct, Academic Conduct, Title IX/Sexual Misconduct Policy and Housing Guidelines.

Additional Information

- Attending every class will help ensure that you do not fall behind on material covered during any particular session. Keep up with the material. Before lecture, read the assigned text to be covered that day in order to gather a basic understanding of the main concepts. Following lecture, re-read the assigned text to gain a deeper understanding of the discussed material. Many of the concepts will build upon one another. Take some time after lecture to look over your notes to make sure you understand the concepts. If you find something unclear, **contact the instructor**. Use the instructor as a resource for any questions you have regarding concepts, practice quizzes, exams, etc. The instructor's goal is to help you gain an understanding of biology, which will help you meet your goal of receiving a good grade.

- ***Syllabus Disclaimer:*** This syllabus is not a contract. *It is a working document that organizes this course by outlining expectations for deadlines, grading, final projects, and examinations. This syllabus explains the goals students will strive for during the semester based on expectations of the instructor. It contains definitive highlights essential to course competencies. However, if something academically probative arises unexpectedly, the instructor will seize that opportunity in the moment beyond what is contained in this syllabus. All expectations within this syllabus are consistent with university policies, handbooks, and catalogs.*